Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A method for measuring the flow velocity of a fluid flowing through a conduit, the method comprising:

providing an array of at least two ultrasonic sensors ~~sensor units~~ disposed at predetermined locations along ~~a longitudinal axis of~~ the conduit along a longitudinal direction of the conduit, ~~each sensor unit including an ultrasonic transmitter and an ultrasonic receiver,~~ each ultrasonic sensor ~~sensor unit~~ providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid; ~~between each respective ultrasonic transmitter and ultrasonic receiver;~~

processing the sensor signals to define a convective ridge in the k-ω plane; and

determining the slope of at least a portion of the convective ridge to determine the flow velocity of the fluid.

2. – 10. (Canceled)

11. (Currently Amended) An apparatus for measuring the flow velocity of a fluid flowing through a conduit, the apparatus comprising:

an array of at least two ultrasonic sensors ~~sensor units~~ disposed at predetermined locations along the conduit along a longitudinal direction of the conduit, ~~each sensor unit including an ultrasonic transmitter and an ultrasonic receiver,~~ each ultrasonic sensor ~~unit~~ providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid; ~~between each respective ultrasonic transmitter and ultrasonic receiver;~~ and

a processor that defines a convective ridge in the k-ω plane in response to the sensor signals, and determines the slope of at least a portion of the convective ridge to determine the flow velocity of the fluid.

12. (Previously Presented) The apparatus of claim 11, wherein the processor samples the sensor signals over a predetermined time period, accumulates the sampled sensor signals over a predetermined sampling period, and processes the sampled sensor signals to define the convective ridge in the k-ω plane.

13. (Original) The apparatus of claim 11, wherein the processor further determines the orientation of the convective ridge in the k-ω plane.

14. (Previously Presented) The apparatus of claim 11, wherein the sensor signals are indicative of vortical disturbances with the fluid.

15. (Original) The apparatus of claim 11, wherein the processor uses a beam forming algorithm to define the convective ridge in the k-ω plane.

16. (Currently Amended) The method of claim 15, wherein the beam forming algorithm includes one of a Capon algorithm ~~Algorithm~~ and a MUSIC algorithm. ~~Algorithm.~~

17. (Original) The apparatus of claim 11, wherein the processor determines the slope of at least a portion of the convective ridge by approximating the convective ridge as a straight line.

18. (Currently Amended) The apparatus of claim 11, wherein each ultrasonic sensor includes an ~~the~~ ultrasonic transmitter and an ultrasonic receiver ~~of a sensor unit~~ which are disposed such that the ultrasonic signal propagating therebetween is orthogonal to the direction of the fluid flow.

19. (Currently Amended) The apparatus of claim 11, wherein the processor further ~~determines the cross-sectional area of the conduit, and~~ determines the volumetric flow rate of the fluid.

20. (Currently Amended) The apparatus of claim 11, wherein the parameter of the sensor signals is ~~are at least one of the amplitude and~~ the transit time to propagate through the fluid.

21. (Currently Amended) An apparatus for measuring the flow velocity of a fluid flowing through a conduit, the apparatus comprising:

an array of at least two ultrasonic sensors ~~sensor units~~ disposed at predetermined locations along the conduit along a longitudinal direction of the conduit, ~~each sensor unit including an ultrasonic transmitter and an ultrasonic receiver,~~ each ultrasonic sensor ~~unit~~ providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid; ~~between each respective ultrasonic transmitter and ultrasonic receiver;~~

means for processing the sensor signals to define a convective ridge in the k-ω plane; and

means for determining the slope of at least a portion of the convective ridge to determine the flow velocity of the fluid.

22. – 26. (Canceled)

27. (Currently Amended) The apparatus of claim 37, ~~11,~~ wherein the ultrasonic sensors ~~sensor units~~ are disposed in pitch-catch configuration wherein the transmitter and receiver are mounted opposing each other or mounted adjacent each other.

28. (Currently Amended) The apparatus of claim 11, wherein the ultrasonic sensors ~~sensor units~~ are disposed in a pulse-echo configuration.

29. (Currently Amended) The apparatus of claim 11, wherein the at least ~~2~~ two ultrasonic sensors ~~sensor units~~ comprise an array of ultrasonic sensors ~~sensor units~~ comprising at least 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, or 16 ultrasonic sensors. ~~sensor units.~~

30. (New) The apparatus of claim 11, wherein the parameter of the sensor signals is the amplitude of the sensor signals.

31. (New) The apparatus of claim 11, wherein the ultrasonic sensors are clamped onto an outer surface of the conduit.

32. (New) The apparatus of claim 11, wherein the ultrasonic sensors are attached to the conduit.

33. (New) The apparatus of claim 32, wherein the ultrasonic sensor are in contact with the fluid.

34. (New) The apparatus of claim 11, wherein the fluid is a single phase fluid.

35. (New) The apparatus of claim 11, wherein the fluid is a multiphase mixture.

36. (New) The apparatus of claim 35, wherein the multiphase mixture includes liquid and gas; or liquid and solids; or gas and solids; or gas, liquid and solids.

37. (New) The apparatus of claim 11, wherein each ultrasonic sensor includes an ultrasonic transmitter and an ultrasonic receiver.

38. (New) The apparatus of claim 37, wherein the ultrasonic transmitter and the ultrasonic receiver of each ultrasonic sensor are disposed opposing each other such that the ultrasonic signal propagates throught the fluid substantially orthogonal to the direction of the fluid flow.

39. (New) The apparatus of claim 11, wherein each ultrasonic sensor includes an ultrasonic unit having both an ultrasonic transmitter and an ultrasonic receiver.

40. (New) The apparatus of claim 39, wherein the transmitter of each ultrasonic unit transmits an ultrasonic signal that propagates through the fluid substantially orthogonal to the direction of the fluid flow, which reflects back substantially orthogonal to the direction of the fluid flow to the receiver of each ultrasonic unit.

41. (New) An apparatus for measuring the flow velocity of a fluid flowing through a conduit, the apparatus comprising:

an array of at least three ultrasonic sensors disposed longitudinally at predetermined locations along the conduit along a longitudinal direction of the conduit, each ultrasonic sensor providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid; and

a processor, in response to the sensor signals, that determines the flow velocity of the fluid.

42. (New) The apparatus of claim 11, wherein the processor uses an array processing algorithm.

43. (New) An apparatus for measuring the flow velocity of a fluid flowing through a conduit, the apparatus comprising:

an array of at least two ultrasonic sensors disposed longitudinally at predetermined locations along the conduit, each ultrasonic sensor providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid substantially orthogonal to the direction of the fluid flow; and

a processor, in response to the sensor signals, that determines the flow velocity of the fluid.

44. (New) An apparatus for measuring the flow velocity of a fluid flowing through a conduit, the apparatus comprising:

an array of at least two ultrasonic sensors disposed longitudinally at predetermined locations along the conduit, each ultrasonic sensor providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid; and

a processor using an array processing algorithm to determine the flow velocity of the fluid.